Australian Government

National Land & Water Resources Audit

An initiative of the Australian Government

ECOLOGICALLY SIGNIFICANT INVASIVE SPECIES

INDICATOR HEADING

Selected ecologically significant invasive vegetation species extent and impact

INDICATOR PROTOCOL

Extent of active management

Endorsed

This protocol has been endorsed by the National Land and Water Resources Audit Advisory Council. Version 1 – May 2008. The indicators will need to be further developed as identified within the protocol.

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Extent of active management

Status of indicator agreement

The National Land & Water Resources Audit (the Audit) coordinates the collation of data to support reporting on natural resource condition required under the National NRM Monitoring and Evaluation Framework (National M&E Framework).

The National M&E Framework identifies three requirements for monitoring natural resource condition:

- a set of resource condition indicators to measure progress toward the agreed national outcomes on a medium and long term basis
- a set of indicators for monitoring community and social processes relevant to or affected by NRM programs, as well as measures of the adoption of sustainable development and production techniques
- contextual data pertinent to the indicator being considered.

The Audit Advisory Council has agreed to a process for achieving a practical set of indicators under the National Monitoring and Evaluation Framework.

This process is to:

- obtain on-going **recommendations** from the relevant **National Coordination Committees** for each thematic area (including "Matters for Target") on appropriate indicators, protocols and information needs
- seek **endorsement** from the **Audit Advisory Council** that the indicators and protocols can be implemented at the national, state / territory and regional levels
- seek **agreement** from the Natural Resource Policies and Programs Committee (**NRPPC)** (or the Marine and Coastal Committee –**MACC**- for Estuarine, Coastal and Marine) that the indicators will be used and promoted by jurisdictions to underpin evaluations of NRM initiatives.

The NRPPC and MACC report to the Natural Resource Management Ministerial Council (NRMMC).

Indicator Protocol: The extent of active management

Version 1(May 2008)

Matter for target

Ecologically significant invasive species.

Indicator heading

Selected ecologically significant invasive vegetation species extent and impact.

Indicator name

Extent of active management.

This document presents the recommended monitoring protocol for collecting, collating and reporting information on the extent of active management for national, state/territory and regional application.

1. Definitions

Active management: Active management is defined as any action that is undertaken to control the impact, extent and density of weeds. It includes physical, chemical and biological control of weeds such as[1]:

- application of herbicides
- use of biological control agents
- slashing, cutting or mowing
- cultivation
- pulling, manual removal or chipping
- crop or grazing management
- burning
- other activities

2. Rationale

Invasive vegetation species (weeds) have a major effect on Australia's natural ecosystems and biodiversity, as well as on agricultural and forestry production, community health and safety,

[1] Source ABS Natural Resource Management on Australian Farms (Cat.no. 4620.0)

amenity, infrastructure, tourism, economic well-being and quality of life. Weed research and control are expensive, and often compete with other land management activities for scarce resources.

Consistent monitoring of the extent, density and distribution of weed species aligned with information related to actions that manage or seek to control the species will enable stakeholders to assess how weed species are responding to management interventions. To be useful, monitoring requires data and information on the effectiveness of control activities (e.g. rate of change, causes of change in distribution and abundance).

This indicator quantifies the type and extent of active management.

In particular the protocol outlines:

- A method to collect and collate baseline information on the extent of active management throughout Australia.
- Alignment of actions being undertaken with information on the distribution and extent of established, new and emerging species (see *Indictor Protocol: Extent, density and distribution of weeds*).

The identification of assets being protected in the area under active management will also assist in determining the required action and the overall extent of action required to protect the asset.

3. Methodology

3.1. Monitoring Frequency

Monitoring of the extent of active management should depend on the type of action. For efficiency monitoring activity should be aligned with project reporting schedules and the management program being undertaken. Recommended frequencies are;

- annually at a detailed scale (i.e. finer than 25,000) for new incursions,
- 2–3 years for emergent species,
- 4–5 years for established species.

3.2. Data Collection and Collation

3.2.1. National Collections

A series of nationally agreed consistent approaches for the collection of weed information at regional and local scales already exist. For example:

- the Cooperative Research Centre for Australian Weed Management's *Introductory Weed Management Manual* provides guidelines for use by landholders, catchment management groups and others involved at a local scale to map weeds and develop local weed management plans.
- the Bureau of Rural Sciences, *A Field Manual for Surveying and Mapping Nationally Significant Weeds* by McNaught et. al. (2006), aimed at land managers, land management agencies and research organisations, based on collecting a set of core attributes agreed by

the Australian Weed Committee for monitoring the distribution and spread of Weeds of National Significance (WONS). This manual explains in detail the data collection and quality assurance procedures necessary to obtain information in a systematic way.

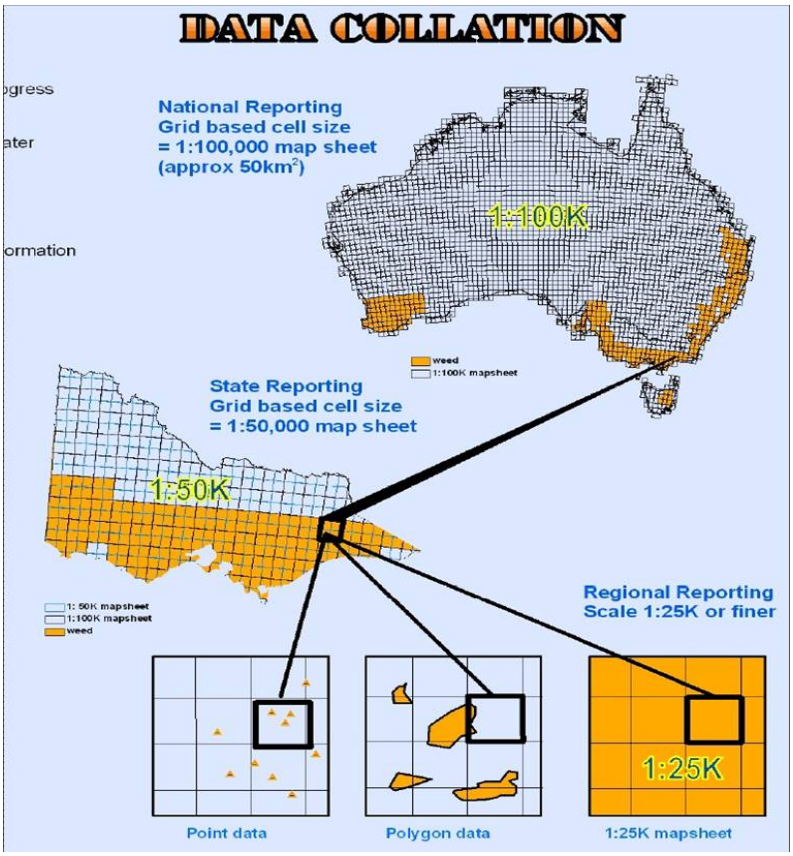
3.2.2. National Collations

It is recommended that the extent of active management be reported according to the broad methodology provided here. Basically the action should be recorded as occurring on a date (or dates) at a point, polygon or grid cell (figure 1).

The recording of action and by maintaining the datasets over time, will allow the collation of local, regional or jurisdictional information of where management action is occurring or has occurred under a particular program.

There may be many individuals, agencies and organisations managing invasive species under various sources of funding. Ideally a "single point of truth" or combined data set for presenting regional or jurisdictional collations of management action should be obtained. Unless total management action is recorded across all programs, only part of the management picture will be presented.

Figure1. Data Collation



Currently the Australian Bureau of Statistics conducts Australia wide surveys that include information regarding the extent and costs of managing weeds

The ABS' Natural Resource Management Survey is an ongoing biennial collection of natural resource management data and is issued as a subsample of the Agricultural Commodity Survey. It has collected information on weed management in two previous collections (2004–05 and 2006–07) and has a sample size of about 20 000. While the questions may vary in subsequent collections, weed management information is likely to continue to be collected given that the 2004–05 survey

results showed weeds were the most costly activity and the most commonly reported NRM issue. Information from this survey can be represented spatially using regional compilations of the data and meshblocks. Survey questions are available through the ABS (Natural Resource Management Survey, 2006-07).

The Australian Bureau of Agricultural and Resource Economics' Natural Resource Management Survey of Australian Farms is run every three years as a supplement to the broad acre and dairy survey. It sample size is roughly 1000 to 1500 and asks questions such as 'estimate the cost of work carried out under management control of animal pests or weeds primarily for the control /prevention of land degradation'. Results of the 2004-2005 can be found at: http://www.abareconomics.com/publications_html/crops/crops_06/nrm_ausfarms.pdf

Aligning the reporting of management action at the local or regional scale with information being collected via nationally consistent and coordinated surveys (e.g. ABARE / ABS surveys) as well as information related to national program investments will increasingly allow overall interpretations as to the extent of a particular invasive species, the extent and costs of active management.

3.2.3. State/territory collections

Most jurisdictions currently collect information on active management as part of control programs. These data may be collected in the form of quantitative point, line and polygon information. In most cases such data will need to be modified or re-classified to meet requirements for national reporting - for example using a 1:100 000 grid. Data aggregation guidelines have been developed to facilitate this process.

3.3. Data Access, Storage and Management

Responsibilities for management of data that is collected, collated and reported by regional groups should be negotiated with the relevant regional and/or state/territory authorities. In principle data should be maintained and be readily accessible for state and national reporting, and stored and managed in accordance with nationally agreed policies and guidelines established by the Australia and New Zealand Information Council (ANZLIC) – the Spatial Information Council. Relevant authorities at State/territory level should be the custodians of their specific datasets.

It is important that national level information be updated via links to relevant regional and state/territory database/information systems. This way data is managed as close to the source of the data as possible and if required access by national systems is made as efficient as possible.

Data access arrangements need to be developed with various stakeholders and may influence data confidentiality (refer section 5.2).

3.4. Metadata Statement

It is a basic pre-requisite that metadata documentation is completed for all datasets. Such statements should be consistent with ANZLIC standards [2] Note ANZLIC is working towards the international ISO 19115 standard[3] .

[2] http://www.anzlic.org.au/policies.html (click Metadata protocol and standard metadata profile)

[3] http://www.osdm.gov.au/ANZLIC_MetadataProfile_v1-1.pdf?ID=303

4. Weed mapping

4.1. Species selection

Weeds to be controlled will depend on local needs and issues the legislative requirements for controlling weed and noxious species in the locality, the level of threat to an asset and the relative ease of control. A number of significant frameworks and methods exist for prioritising weeds (e.g. Groves et al 2003).

Working with the Australian Weeds Committee, the National Land & Water Resources Audit's 2008 National Weed Assessment has mapped the extent and density of 98 species using a national reporting unit of a 1:100 000 map sheet. The list represents a statement of some of those species considered significant at the national level. The list comprises the WONS, the list of weeds nominated for assessment as a WONS (i.e. the WONS candidate list), the National Environmental Alert list and the Agricultural Sleeper list. A list of species and their respective source list are provided in: *Indictor Protocol: Extent, density and distribution of weeds* Appendix 3.

Note: for the purposes of data presentation and the development of information products, in most cases, weeds are mapped at the species level. However, in some cases a finer level of taxon may be more appropriate. For example, in the case of *Chrysanthemoides* the distribution and abundance should be recorded for both subspecies (boneseed and bitou bush) separately as they occur in different habitats and have different control requirements. In addition, some WONS are not individual species but groups of species. For example, in the case of 'willows', all species are included except weeping willow, pussy willow and sterile pussy willow.

5. Reporting / Information Products

5.1. Audiences

Information on the extent of active management is of benefit to multiple users at differing scales. Local and regional level products support decision-makers to allow designing, evaluating and refining control programs, NRM regional planning, and the development of regional investment strategies. State/territory information products provide decision-makers and managers with the information necessary to guide the allocation of resources for control, disease surveillance, contingency planning, plus other areas such as informing policy, and the development and implementation of legislation.

National and state/territory level information is also useful for plant health and bio-security authorities, and reporting the magnitude of control programs at a national level for industry, research organisation, regulatory authorities and quarantine services. In addition, information products support a range of other users including education, improving general awareness, engagement of the broader community, for example water management authorities.

5.2. Confidentiality

Maintaining confidentiality of data will be the responsibility of the custodian of the data e.g. the relevant management authority at state/territory level responsible for monitoring and reporting weed information.

5.3. Products

Various information products can be developed for datasets at differing scales (local, regional, state/territory and national) providing information on the extent of active management. In addition,

summary reports and statistics can be developed to gauge the effectiveness of management over time. Products may include descriptive maps (at regional, state/territory and national levels – e.g. Figures, 2, 3 and 4) with corresponding summary details in the form of integrated products on the area inhabited by weeds, and their associated control programs.

Figure 2. Example of a national product: weeds spread and management actions of Prickly Acacia. (Map production by Queensland Dept Primary Industries and Fisheries)

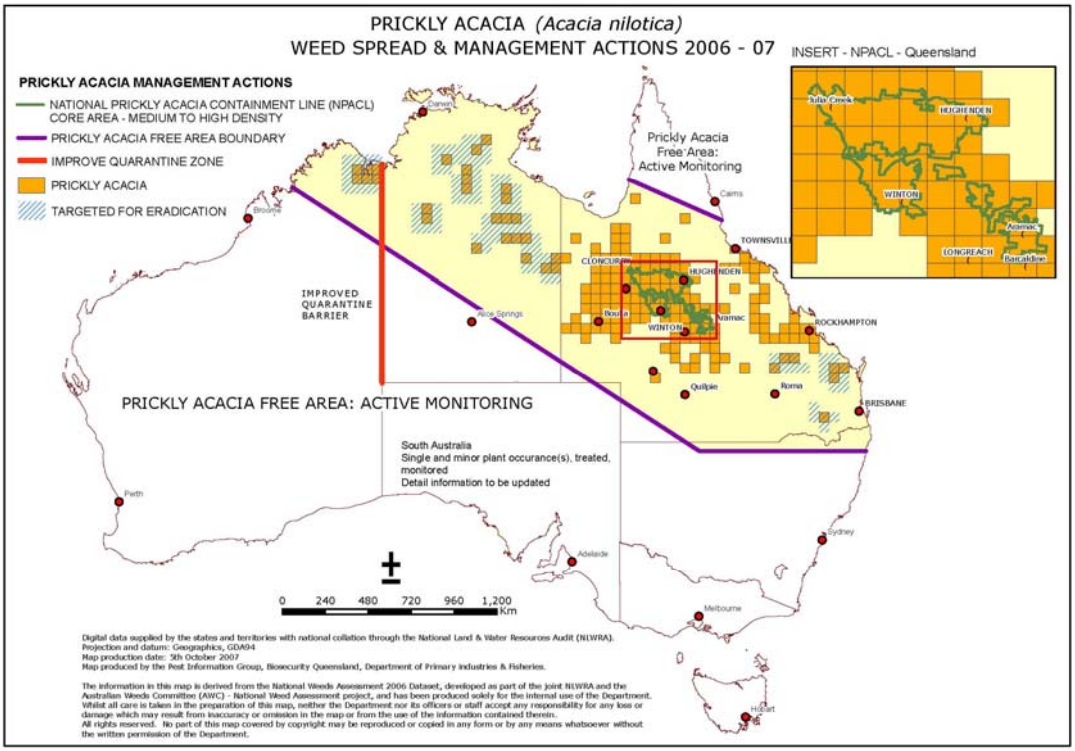


Figure 3. National collation (Source:NRM on Australian Farms Survey 2004-2005, ABS cat no, 4620.0

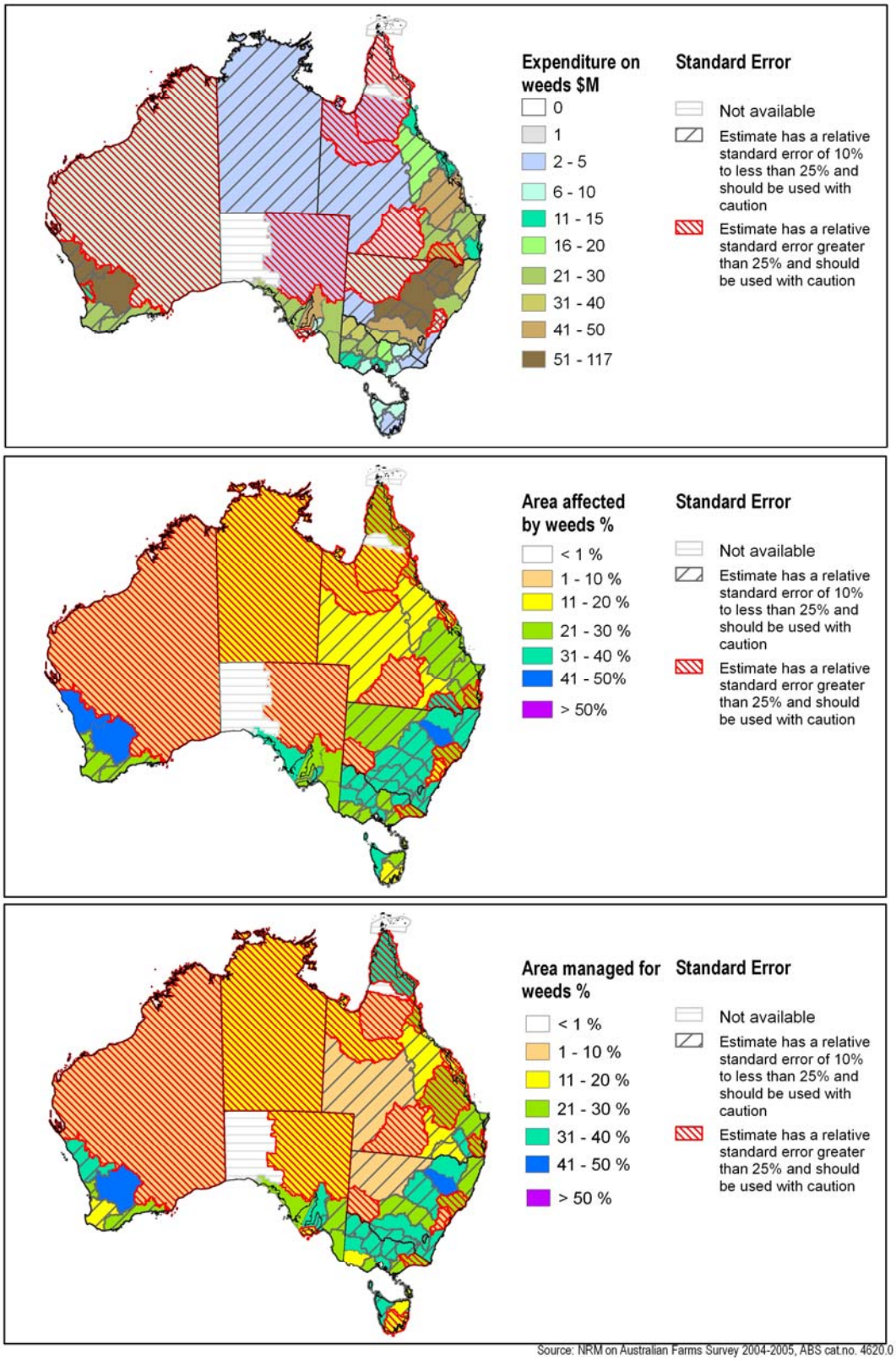
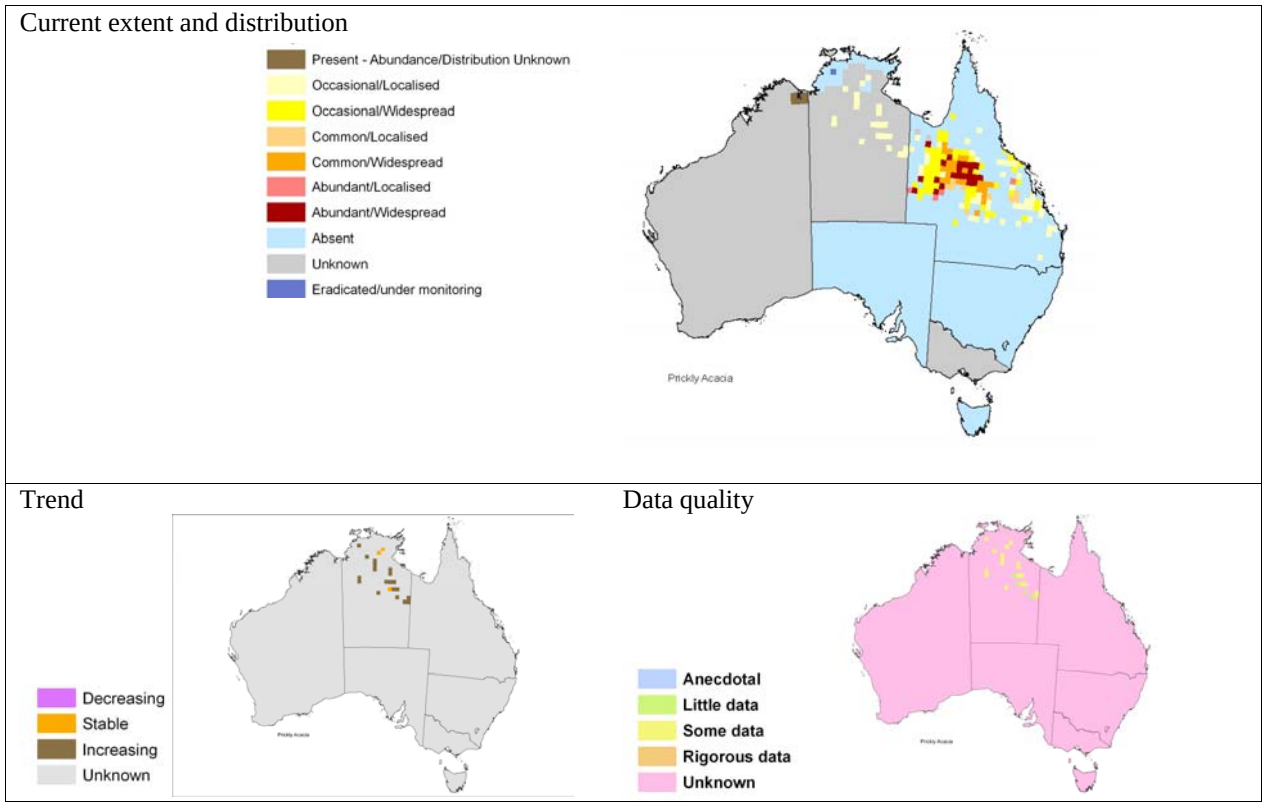


Figure 4. Extent and distribution of Prickly Acacia (Source: Assessing invasive plants in Australia, 2008, National Land and Water Resource Audit)



6. Links to other Indicators

Other indicators relevant to extent, density and distribution of invasive species are:

- Selected ecologically significant invasive vertebrate species extent and impact http://www.nrm.gov.au/publications/factsheets/me-indicators/significant-species.html
- Selected significant native species and ecological communities extent and conservation status http://www.nrm.gov.au/publications/factsheets/me-indicators/invasive-species/vertebrate.html
- Estuarine, coastal and marine habitat extent and distribution: pest species (number, density, distribution) http://www.nrm.gov.au/publications/factsheets/me-indicators/estuarine/pest-species.html.

7. Further Information

Specific references

Australian Bureau of Statistics (2006) Natural Resource Management on Australian Farms, 2004–05 (cat no 4620.0). Refer http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4620.02004-05?OpenDocument

Australian Bureau of Statistics (2007) Natural Resource Management on Australian Farms,

2006–07 (cat no 4624). Refer
http://www.abs.gov.au/AUSSTATS/abs@.nsf/95553f4ed9b60a374a2568030012e707/1cb7e21022e88f72ca25735b00131412/$FILE/ATT2UB54/71010_NRM-07%20sample.pdf

CRC for Australian Weed Management (2004). Introductory Weed Management Manual. Cooperative Research Centre for Australian Weed Management, Adelaide.

Groves R H, Hoskings J R, Batianoff G N, Cooke D A, Cowie I D, Johnson R W, Keighery G J, Lepschi B J, Mitchell A A, Moerkerk M, Randall R P, Rozefelds A C, Walsh N G and Waterhouse B M (2003). Weed Categories for Natural and Agricultural Ecosystem Management, Bureau of Rural Sciences, Canberra.

McNaught I, Thackway M, Brown L and Parsons M (2006). A field manual for surveying and mapping nationally significant weeds. Bureau of Rural Sciences, Canberra.

Standards Australia/Standards New Zealand/Cooperative Research Centre for Australian Weed Management (2006) Handbook 294:2006 National Post-Border Weed Risk Management Protocol.

Thackway R, Yapp G, Cunningham D and McNaught I (2003). Towards a national set of core attributes for mapping Weeds of National Significance (WONS), discussion paper September 2003, Bureau of Rural Sciences, Canberra.

Thorp J R and Lynch R (2000). The determination of weeds of national significance. National Weeds Strategy Executive Committee, Launceston.

Relevant Websites

- Australian Government Department of Agriculture, Fisheries and Forestry
  http://www.daff.gov.au

- Australian Government Department of the Environment, Water, Heritage and the Arts
  http://www.environment.gov.au

- Australian Capital Territory — Environment ACT
  http://www.environment.act.gov.au

- CRC for Australian Weeds Management
  http://www.weeds.crc.org.au/

- New South Wales — Department of Primary Industries
  http://www.dpi.nsw.gov.au

- Northern Territory — Department of Natural Resources, Environment and the Arts
  http://www.nt.gov.au/nreta

- Queensland — Department of Natural Resources and Water
  http://www.nrw.qld.gov.au

- South Australia — Department of Water, Land and Biodiversity Conservation
  http://www.dwlbc.sa.gov.au

- Tasmania — Department of Primary Industries and Water
  http://www.dpiw.tas.gov.au

- Victoria — Department of Sustainability and Environment
  http://www.dse.vic.gov.au

- Weeds Australia

http://www.weeds.org.au

- Western Australia — Department of Agriculture and Food
  http://www.agric.wa.gov.au

8. Glossary

Abundance: Relates to the number of individuals or population of species. In a quantitative situation it might be a count (eg 100) or range (eg 100–150) whereas in a qualitative situation it might be abundant, common or occasional.

Assets: May be in the form of biodiversity, environment, production service, goods or values based.

Cover: The percentage of area a weed occupies over the ground or canopy – see appendixes 3–5 in WONS Field Manual (McNaught et al 2006) for more information.

Density: Is a measure of abundance per unit area. In a quantitative situation it might be 100/sq km or 100–150/sq km. In a qualitative situation, and for the purposes of reporting state/territory and national data in map format, it could be represented as for abundance and (eg occasional).

Distribution: Relates to the spatial pattern of species over an area (eg widespread or localised within a given area).

Emerging species: A newly established weed species whose extent, distribution and abundance is expanding (ie trend is increasing), and whose impacts are likely to be significant.

Established:

Extent: Broad-scale distribution of weeds.

Impact: Defined as any detrimental consequence of a weed on assets.

New incursions: Defined as any introduced (non-endemic) weed species that has not been recorded previously at a location and whose impacts are likely to be significant.

Occurrence: Relates to the 'presence' of a particular species within an area — whether it is present, absent or no data available (ie status is unknown, area un-assessed). When additional information is available the presence class of occurrence can be described further in terms of distribution and abundance — see above. Occurrence information based on presence/absence is used to determine the extent of a weed.

Significant: Defined by state/territory and national declarations and recommendations from relevant national authorities.

Trend: Defined as the change in distribution/abundance over time. Classified as increasing, decreasing, stable or unknown. For the purposes of current mapping work, trend is assessed as increasing/decreasing or stable over the last five (5) years.

Widespread: Species occurs in most areas and occupies greater than 50% of a cell.